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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,614	11/21/2003	Duck-Chul Hwang	51089/P849	3144

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CHRISTIE, PARKER & HALE, LLP
PO BOX 7068
PASADENA, CA 91109-7068

EXAMINER

CHU, HELEN OK

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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08/16/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/719,614

Applicant(s)

HWANG, DUCK-CHUL

Examiner

Helen O. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 and 24-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-22, 24-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

1. Applicant's Remarks/Arguments was received on 6/6/2007.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action.

Specification

3. The amendment filed 6/6/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "in μm " in Tables 3-6, 10-13, 16-19, 22-25, .

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

4. The rejections under 35 U.S.C 112, first paragraph, on claims 16-22,24-30 are maintained. The rejection is repeated below for convenience.
5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
6. Claims 16-22,24-30 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The measuring units for the surface roughness

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range of "2.2-2.9" are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). It is known in the art to measure the surface roughness in a particular unit, for example, microns or nanometers but because a measuring unit was never defined in the specification it does not lead one of ordinary skill to conclude what units the claimed invention should correspond.

7. The rejections under 35 U.S.C 112, second paragraph, on claims 16-22,24-30 are maintained. The rejection is repeated below for convenience

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 16-22,24-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation in claim "surface roughness of the positive electrode is in the range of 2.2 to 2.9" is unclear to the Examiner. It is known in the art to measure the surface roughness in a particular unit such as microns or nanometers but because a unit was never defined in the specification it does not lead to one of ordinary skill to conclude which units the claimed invention should correspond.

Claim Rejections - 35 USC § 103

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10. The rejections under 35 U.S.C 103 (a), on claims 16-22,24-30, as unpatentable Gorkovenko et al. in view of Kuwana et al. are maintained. The rejection is repeated below for convenience

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 16-22,24-30 are rejected under 35 U.S.C. 103(a) as obvious over Gorkovenko et al. (US Patent 6,210,831) in view of Kuwana et al. (US Patent 4,541,905)

13. In regard to claims 16-18, 24 and 25, Gorkovenko et al. teaches a cathode with electroactive sulfur material in a battery (Title) with conductive filler (Column 5, line 65), a binder (Column 6; Line 5) and an aluminum oxide additive (Column 15, Line18). The Gorkovenko et al. reference further specifies that the weight ratio of the aluminum oxide to lithium octasulfide of 6.2 to 1 (Column 15, Lines 23-25). Table 1 indicates the specific weight percent of octasulfide in an amount of 2.3. If aluminum oxide is 6.2 times more than octasulfide then the weight percentages of aluminum oxides should be 14.62. The Gorkovenko et al. reference does not teach a surface roughness to be at 2.2-2.9, however, the Kuwana et al. discloses that the surface roughness is proportional to the diameter of the particle, that is, surface roughness would increase as the particle diameter increases (Column 5, Lines 5-10). Therefore, it would have been obvious to

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have the same surface roughness as disclosed by the Applicants because the diameter of the particle is the same as taught in the prior art of Kuwana et al. and Gorkovenko et al.

In regard to claims 19-21, the Gorkovenko et al. reference discloses polysulfide polymer particle to be pre-ground to 10 microns or less (Column 22, Lines 33-35).

In regards to claim 22, the Gorkovenko et al. reference discloses polysulfide polymer particle to be pre-ground to 10 microns or less. It is the Examiner's position that the amounts in question are so close that it is a prima facie obvious case that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp v. Banner*, 227 USPQ 773

In regard to claim 26, the Gorkovenko et al. reference teaches a sulfur base compound consisting of Li_2S_8 (Column 20, Line 62) and a carbon-sulfur polymers of with the formula of $(\text{C}_2\text{S}_z)_n$ where z ranges from 1-100 and n is equal to 2 (Column 13, Lines 44-46)

In regards to claims 27-30, the Gorkovenko et al. reference discloses a coating layer (Column 22, Line 46-47) that comprises a polyethylene oxide, silica, and a conductive carbon (Column 22, 35-40)

Response to Arguments

14. Applicant's arguments filed June 6, 2007 have been fully considered but they are not persuasive.

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Applicant's principal arguments are

A) R_a is a arithmetic average height of the bumps on a surface, measured in micrometers or microinches. Looking at Figure 2 of the present invention, the scale, which is measured has units of micrometers, indicates that the "bumps" on the surface of the electrode are on the order of 2.2 to 2.9 micrometers. This is further supported by the specification as filed at page 3, line 31. Therefore, one of skill in the art would know that the surface roughness parameters in the present application have units of micrometers. Thus, the disclosure has been fully enabled as filed and the claims are not indefinite.

B) Kuwana et al. does not discuss why one would want to increase or decrease the surface roughness, and what impact it would have on the electrode. Further, the Kuwana et al. does not give any guidance as to what surface roughness values should be used... Gorkovenko et al. and Kuwana et al. are silent as to the decrease in surface roughness and the life cycle characteristics that are improved within the amount of the inorganic additive claimed in the present invention.

In response to Applicant's arguments, please consider the following.

A) Figure 2 does not measure R_a , as a matter of fact there is absence of disclosure in the specification that Figure 2 measures R_a . Figure 2 measures particle size. If R_a measures bumps or average height of particles, why would anyone of ordinary skill measure the width of these bumps on the surface. Furthermore, the measurement of the particles are less than 1 micron therefore, it cannot be in the order of 2.2 to 2.9 as the Applicant's stated in the arguments.

Page 3, Line 31 certainly does not support Figure 2. Page 3, Line 31 states "the additive with the above particle size renders a decrease in the average surface roughness of R_a of 5 μm ." This simply states the **decrease** of surface roughness is 5 μm and not the unit of R_a in the Tables. One of ordinary skill cannot assume that because the decrease of surface roughness is 5 μm that the actual data provided is in micrometers. An example since the Applicants argue that R_a can commonly be measured in microinches (however, R_a can also be measured in nanometers of which the Applicants fail to mention), the units can be 1×10^6 microinches, 1×10^3 microinches 1×10^6 nm etc. Furthermore, Table 7 indicates the immerse height of additives measured in mm (millimeters); one of ordinary skill would also assume that R_a is measured in mm.

B) Kuwana et al. reference was used to indicate that the surface roughness is dependent upon the size of the particle. Since, there are no indications of units in R_a , one of ordinary skill would predict that because the size of the particle of Kuwana et al. and Gorkovenko et al. is the same of the Applicant's claimed invention (within the range of 5-5000nm) than one of ordinary skill in the art would relate the same particle size to having the same surface roughness as in the claimed invention.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen O. Chu whose telephone number is (571) 272-5162. The examiner can normally be reached on Monday-Friday 8am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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TRACY DOVE
PRIMARY EXAMINER
8/07